REPORT NO. 79-2-1

OCTOBER 1978
3430

BIOLOGICAL EVALUATION OF THE SPB ON THE TOMBIGBEE NATIONAL FOREST IN MISSISSIPPI

U. S. Forest Service
Pineville, Louisiana

U. S. DEPARTMENT OF AGRICULTURE -- FOREST SERVICE
SOUTHEASTERN AREA, STATE AND PRIVATE FORESTRY
RESOURCE PROTECTION UNIT, FOREST INSECT AND DISEASE MANAGEMENT GROUP

REPORT NO. 79-2-1

OCTOBER 1978
3430

BIOLOGICAL EVALUATION OF THE SPB ON THE TOMBIGBEE NATIONAL FOREST IN MISSISSIPPI

by

James D. Smith[1/]

A biological evaluation was conducted on the Tombigbee National Forest the week of September 19 to 22, 1978. The purpose of the evaluation was to determine the current status of southern pine beetle (Dendroctonus frontalis Zimmerman) populations in the area and to determine what action, if any, would be necessary in FY 79.

METHOD OF EVALUATION AND ANALYSIS OF SPB INFESTATION

Aerial Survey

Standard aerial sketch map procedures were used for this evaluation, except that survey coverage was 100 percent.[2/] District personnel made the survey and spots of red and/or fading trees were recorded and plotted on Forest Service Class A maps.

Attack/Emergence Evaluation

The attack:emergence analysis procedure for estimating SPB population trends was adapted as a predictive tool.[3/] Analysis of population trends of the SPB by this procedure predicts future spot growth based on the ratio of southern pine beetles entering the trees to the number of beetles emerging (this is both attacking adults and developed brood). For purposes of this evaluation, the procedure will be referred to as the attack:emergence ratio. This procedure predicts future spot growth of spots based on data taken in the fall

---

1/ Entomologist, USDA, Forest Service, Southeastern Area, State and Private Forestry, Pineville, La.

2/ Detection of Forest Pests in the Southeast, 1970. USDA, USFS, Southeastern Area, State and Private Forestry, Publ. S&PF-7, Atlanta, Ga. 51 p.

3/ Moore, Gordon E. 1977. Factors for Determining Trends in Southern Pine Beetle Spots. J. Environ. Entomol. Vol. 7, No. 3. pp 335 - 341.

of the year. A prediction of SPB increase would require an attack:emergence ratio of 1:10 or greater. Attack:emergence ratios for spots predicted to remain static in growth would be 1:5 - 1:9.9. A decreasing population would have an attack:emergence of less than 1:4.9. This procedure has been proven on a spot basis for a 2-year period in North Carolina.[3/] This evaluation assumes that spot growth as predicted by the attack:emergence bark sample analysis will continue on the forest on an area basis. Predictions are then made using FY 78 project accomplishment data as a baseline. Future analysis will show how well area SPB trends can be predicted from spot trends.

Spots were stratified and observed in size classes 1 - 10, 11 - 20, and > 20 trees (aerial observation). Since most spots had more than 20 trees, only one spot in this size class 1 - 10 was evaluated. The 11 - 20 size class was also evaluated one time and the > 20 size class was evaluated three times. This provided the 20 percent sample recommended by G. Moore.[3/] This was a total of five spots for the Tombigbee National Forest (based on 27 new discoveries).

RESULTS

Twenty-seven new infestations were found ranging from three to 26 red and fading trees.

Five trees per spot were sampled with the results being shown in table 1. Attack:emergence ratios were found to be increasing (A:E > 1:10). Based on the A:E procedure, FY 79 losses should be at least 1.5 times the loss experienced in FY 78.

An increasing condition (1.5X) means that an SPB spot with 50 active trees in October would perpetuate itself throughout the year and would have 75 active trees if rechecked 1 year later. This means that during the course of the year, the spot mortality will total at least 125 trees if it regenerates itself one and one-half times.

Mortality for FY 78 and predicted mortality for FY 79 are found in table 2.

The volume which would be protected by having a project was estimated by use of spot growth formulas. Spot growth formulas project the amount a spot would grow if not salvaged. The difference between salvage volume and the size the spot would have grown to if left alone is the volume protected (Hedden 1976). When compared to the volume affected, the resulting ratio can be used to measure benefits (volume protected) of the control effort. The Affected/Protected ratio on the Tombigbee National Forest is 1:4.67. This ratio is based on observations recorded June - September 1978 (see table 2).

Supplementary Data

Spot growth is proceeding at a very high rate on the Tombigbee National Forest (see table 3). Table 3 shows examples of spots characteristic of the outbreak on the Tombigbee National Forest. There is a high number of green trees infested in the larger spots. Most spots are found on the Ackerman Unit. In addition to the 27 new spots found on the last aerial survey, 21 other spots found on previous flights were also present. These spots currently contain an estimated 500 MBF of affected timber. Larger spots are growing at a very high rate in overstocked or past rotation age stands. The SPB problem manifested itself late in the summer of 1978 (August).

The number of spots, amount of spot growth, and basal areas of affected stands all point to increased activity over FY 79. Basal area is an important mechanism of the spot growth phenomonon (Hedden and Billings 1978).[4/] Here is a list of basal areas found in the spots ground checked on the Tombigbee National Forest.

Spot No.	Pine BA at head of spot
1	150 sq ft/acre
2	270 sq ft/acre
3	180 sq ft/acre
4	130 sq ft/acre
5	130 sq ft/acre
6	140 sq ft/acre
7	100 sq ft/acre
8	90 sq ft/acre
9	140 sq ft/acre
10	130 sq ft/acre
11	150 sq ft/acre

Based on the assumption that basal areas over 120 sq ft/acre increases spot growth and leads to increased damage, there is only one spot in the above list that should not increase significantly in size (Hedden 1978). These spots represent a stratified look at SPB on the forest. These spots are therefore characteristic of the SPB outbreak. This data supports the findings produced by the population trend analysis of the attack:emergence procedure of G. Moore (1977), where increasing SPB populations were found on the forest.

[4/] Hedden, R. and R. Billings. 1978. SPB: Factors Influencing Growth and Decline of Summer Infestations in East Texas. Submitted For. Sci.

DISCUSSION AND RECOMMENDATIONS

SPB suppression activities should continue on this forest with the aid of a FI&DM pest control project. Emphasis should be placed on the larger spots found in dense, natural stands. A salvage control action will minimize losses and prevent spot growth by removing infested material from the forest. Chemical suppression and/or cut-and-leave tactics are recommended only for inaccessible spots or for small spots that cannot be administered any other way. Forest Insect and Disease Management, Pineville, Louisiana, should be contacted prior to the extensive use of chemical control for an update on restrictions and application procedures. If cut-and-leave is to be used, district personnel should plan a training session with FI&DM before the summer season. (The summer season is the only time this control method is recommended).

While direct suppression activities are necessary, it is also possible to reduce future losses through preventative measures. The timber stands in table 4 are 40 years of age or older. They will be entered for compartment prescriptions in FY 79. These stands should be left in the most vigorous growing condition possible as a result of the prescription. Healthy, thrifty stands are one of the better ways to prevent SPB losses.

Here are some ideas on what the prescriptionist should look for to reduce SPB losses:

1. Avoid basal areas in excess of 120 sq ft/acre.

2. Make sure species is matched to site.

3. Note presence of littleleaf or Fomes sites. These sites have been shown to be problem SPB areas.

4. Plan for as little disturbance as possible when these stands are thinned. Damaged stands are susceptible to bark beetle attack.

Many stands on this forest were planted at high stocking levels during the CCC days of the 1930's. These stands are now heavily stocked and should be closely analyzed for need of remedial silvicultural treatment to lessen SPB hazard. If these stands are thinned, FI&DM recommends using the R-8 thinning guides as the maximum leave basal area.

The Tombigbee National Forest has a rapidly expanding SPB population It is important that suppression action be taken to minimize timber loss and to stop spot growth in the larger spots. Because of expected SPB activity, the forest needs to plan enough technician time to implement the work required to meet project objectives.

For further information, contact Forest Insect and Disease Management, Pineville Field Office, Pineville, Louisiana 71360 (Phone FTS 497-3311, or Commercial 318-445-6511, Ext. 311).

Table 1. Attack:Emergence, Tombigbee National Forest

Tree No.	Spot No. 1	2	3	4	5
1	1/9.8	1/12.6	1/7.6	1/9	1/30.4
2	1/9.3	1/9.5	1/11.3	1/6.14	1/6.54
3	1/15.4	1/5.8	1/11.3	1/15.5	1/18.9
4	1/9.6	1/7	1/8.6	1/14.6	1/9.83
5	1/7.6	1/12	1/13.4	1/7	1/14.18
$\bar{x}$	1/10.34	1/9.38	1/10.44	1/10.45	1/15.97

Table 2.[1/] Volume affected vs. volume protected figures for May - September 1978.

Predicted Losses and Volume Protected -- Tombigbee NF - FY 79

	Mortality (MBF)	Volume protected (MBF)		
		Present Vol. Protected	Growth	Total
Tombigbee N.F.	753.60 (502.4 x 1.5)	3519.31	1403.23	4922.54

4.67 is the Affected/Protected ratio from Tombigbee National Forest. Thus, 753.60 MBF times 4.67 plus the growth of immature timber equals the volume protected. 753.60 is derived from 1978 loss times the increase in population indicated by the Attack/Emergence procedure (1.5 x 502.4).

[1/] Data is as reported by districts and extracted from the SPB Information System.

Table 3. Stands, 40 years or older in age, which will be entered for compartment prescriptions in FY 79.

Compartment	Stands	Acres
6	3, 4, 7	132
13	1, 4, 5, 6, 7, 11	370
21	3, 9	233
27	1, 13	168
43	3, 5, 7, 9, 13, 14	376
44	2, 4, 5, 7, 14	591
54	1, 3, 13, 14	331
74	1, 3, 5, 6, 9, 10, 13	904
80	3, 4, 8, 10	388
133	5, 12	103
139	6, 16, 19, 22	91